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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/720,649

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EXAMINER

RAO, SHRINIVAS H

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/720,649

Applicant(s)

LEE, KEVIN J.

Examiner

Steven H. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 5-29 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-4,30-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

Applicants' amendment filed on February 02, 2006 has been entered on Feb. 17, 2006.

Claims 1-31 as recited in the amendment are currently pending in the Application.

Claims 5-29 have been withdrawn as drawn to a non-elected species.

Claims 1-4 and 30-31 are currently under consideration.

Claim Rejections - 35 USC # 1 03

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action.

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4 and 30-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kelly et al. (U.S. Patent No. 6,396,116, herein after Kelly) in view of Distefano et al. (U.S. Patent No. 5,558,928, herein after Distefano) .

With respect to claim 1 Kelly describes an apparatus, comprising a first wafer having a layer of bulk silicon, a first layer of active silicon disposed on the first layer of

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bulk silicon, a first layer of interconnects disposed on the first layer active of active silicon and a first metal pattern disposed on a top surface of the first layer of interconnects ; (Kelly fig. 2 , col. 4 lines 44 to 55) a second wafer having a second layer of active silicon disposed on the second layer of bulk silicon, a second layer of interconnects disposed on the second layer active of active silicon a second metal pattern disposed on a top surface; (Kelly fig. 2 , col.3 lines 7-17, col. 5 lines 5-15, col.5 lines 60-65-second metal) .

Kelly does not specifically mention an interposer disposed between the top surface of the first wafer and the top surface of the second layer of interconnects , wherein the first wafer is turned upside down , the interposer having a pattern of metal vias disposed (in thermoplastic) that are cured.

However Distefano, a patent from the same filed of endeavor, describes in col.5 lines 10-20 col. 1 lines 65-67 and col.2 lines 1 to 9 an interposer disposed between the top surface of the first wafer and the top surface of the second layer of interconnects , wherein the first wafer is turned upside down , the interposer having a pattern of metal vias disposed (in thermoplastic) that are cured to form an unitary mass and cause the flowable dielectric material to flow and conform to the major surface of the circuit panels the pattern of metal vias being aligned with and electrically coupled to the first metal pattern and the second metal pattern and to cross link the material of the thermosetting plastic .

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to include Distefano's an interposer disposed between the top surface of

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the first wafer and the top surface of the second layer of interconnects , wherein the first wafer is turned upside down , the interposer having a pattern of metal vias disposed (in thermoplastic) that are cured in Kelly's device . The motivation to undertake the above ' combination is to form an unitary mass and cause the flowable dielectric material to flow and conform to the major surface of the circuit panels the pattern of metal vias being aligned with and electrically coupled to the first metal pattern and the second metal pattern .(Distefano col. 2 lines 4-5 and col. Col. 4 line 65 to 66 col. 5 line 9) and to cross link the material of the thermosetting plastic wherein the first wafer is bonded to the second wafer face to face using the interposer. (inherent in flip chip bonding).

With respect to claim 2 Kelly describes the apparatus of claim 1, wherein the interposer further comprises of the dielectric film disposed in the cured thermosetting plastic. (Distefano col. 5 lines 8-10).

With respect to claim 3 Kelly describes the apparatus of claim 1 , wherein the cured thermosetting plastic comprises a polyimide material. (Kelly col.5 lines 35-40, Destafano col. 8 lines 49-51).

With respect to claim 4 Kelly describes the apparatus of claim 3, wherein the cured thermosetting plastic comprises an epoxy material.(Distefano col. 8 lines 49-51).

With respect to claims 30 and 31, Kelly describes wherein the first wafer includes a first device disposed in at least a portion of the first metal pattern and the second wafer includes a second device disposed in at least a portion of the second metal pattern. (Kelly figures 4b to 10 B, etc.).

Response to Arguments

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Applicant's arguments filed on 08/18/2005 have been fully considered but are not persuasive for the following reasons :

Applicants' first contention that Kelly " fails to teach or fairly suggest.. a first layer of active silicon disposed on the first layer of bulk silicon.." is not persuasive as it is based on lack of understanding and/or an incomplete analysis of Kell's description. As Applicants' themselves have set out that optical sensors are most commonly formed of active silicon as is well known to one of ordinary skill in the art . Further at least 28 patents including e.g. USP 4,842,357 Doneen claim1 – optical sensor -silicon substrate) at least as early as June 27, 1989 and 27 others e.g 2006/0098127, 2005/87264; 2005/77588; 6,570,197; 6,278,523; 5,426,927;) show that the most prevalent and first substrate that is known in optical sensor is a silicon substrate and further when not specified it is understood that the substrate is silicon, by one of ordinary skill in the art.

Applicants' are arguing what each applied reference does not teach whereas the rejection is based on the combined teachings of the applied references.

The above describes piece meal analysis cannot negate obviousness, as stated in In re Keller , 208 USPQ 871 (CCPA 1981), " In response to Applicants' piece meal analysis of the references, it has been held that cannot show non-obviousness by attacking references individually where as, here , the rejections are based on combinations of references ."

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Applicants' contention that motivation to combine Kelly and DiStefano given by the examiner is disagreed with, is also not persuasive because applicants' seem to be disagreeing with only a part of the motivation. The entire motivation reproduced below is "combination is to form an unitary mass and cause the flowable dielectric material to flow and conform to the major surface of the circuit panels the pattern of metal vias being aligned with and electrically coupled to the first metal pattern and the second metal pattern .(Distefano col. 2 lines 4-5 and col. Col. 4 line 65 t6 col. 5 line 9) and to cross link the material of the thermosetting plastic wherein the first wafer is bonded to the second wafer face to face using the interposer. (inherent in flip chip bonding). Applicants' silence as to the motivation to cross link the material of the thermosetting plastic wherein the first wafer is bonded to the second wafer face to face using the interposer means that at least valid motivation cannot be challenged and is sufficient to combine the two references .

In addition to the above Applicants are ignoring that DiStefano does not limit its teachings as showing contact pads on one side only, but rather teaches placing them anywhere including any side of the substrate and in fact as shown below DiStefano teaches placing contact pads any where and thereafter this placement determines the alignment of the substrates . Further contact pads are not necessary every time for solder balls to joined with . It is well known in the art to join solder balls directly to substrate, with out the presence of solder balls .

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Regardless of whether the second substrate 214 is a ceramic package, a molded plastic package, or a circuit board, the contact pads 214 of the second substrate are electrically connected to the contact pads 210 of the first substrate 206. In an embodiment, the first substrate and second substrate are electrically connected with solder balls 226, although the two substrates may be electrically connected utilizing other conductive members or materials, such as a conductive adhesive that electrically connects the contact pads of the two substrates. Although not shown in FIG. 2, the contact pads of the two substrates may be connected by a combination of conductive balls and an adhesive. In addition to electrically connecting the first substrate and the second substrate, the location of the contact pads on the first substrate and the second substrate determines the alignment of the first substrate, and ultimately the optical sensor 204, in relation to the second substrate and the opening 224 in the second substrate, as shown in FIG. 2.

Therefore Distefano further clarifies that the two substrates can be connected using other conductive members or materials and further the location of the contact pads determines alignment of the first substrate of which make it clear that combining DiStefano and Kelly does not change the principle of operation of either .

Dependent claims 2-4 and 30-31 were alleged to be allowable because of their dependency on allegedly allowable independent claims.

However as see above the independent claims are not allowable. Therefore dependent claims 2-4 and 30-31 are also not allowable.

Therefore all of Applicants' contentions are not persuasive and the all claims are finally rejected.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven H. Rao whose telephone number is (571) 272 - 1718. The examiner can normally be reached on 8.00 to 5.00.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Steven H. Rao

Patent Examiner

April 29, 2006.



LONG PHAM
PRIMARY EXAMINER